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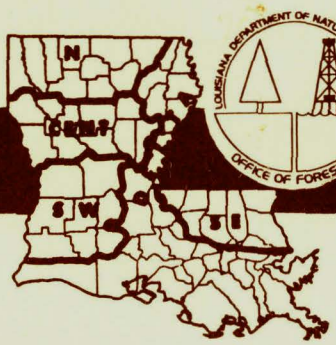

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INSECT AND DISEASE REPORT

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FOREST TENT CATEPILLAR DEFOLIATION IN SOUTH LOUISIANA

By

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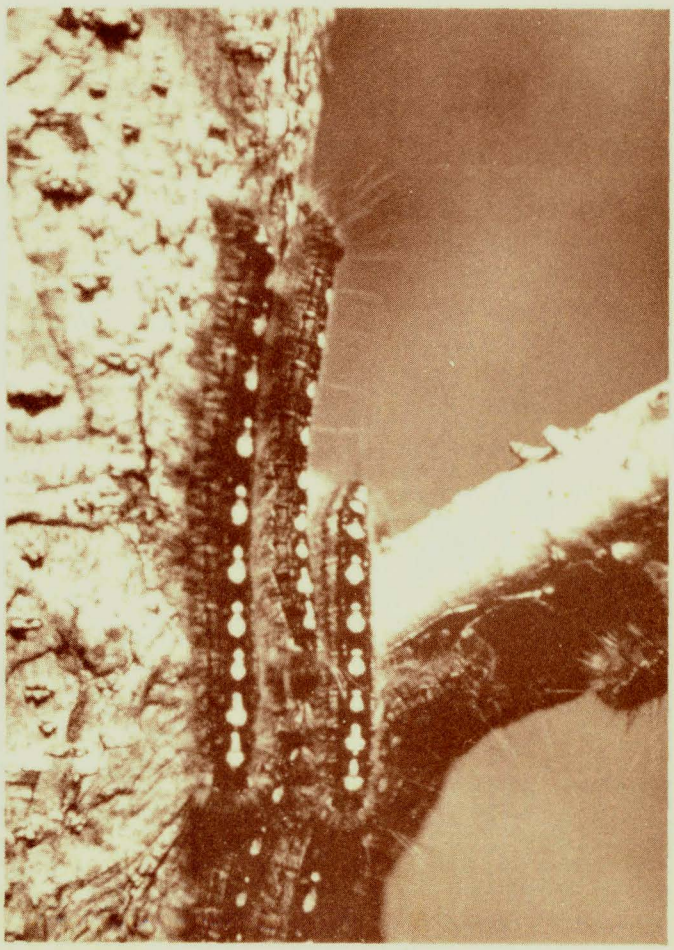

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INTRODUCTION

Outbreaks of the forest tent caterpillar, Malacosoma disstria Hbn., have been recorded in southern Louisiana since 1931 (Hodson, 1941). Aerial detection surveys conducted in Louisiana during the 1960's and 1970's have indicated fluctuating outbreaks ranging from 90,000 acres defoliated in 1962 to 520,000 acres defoliated in 1971 (Nachod, 1977; Nachod and Kucera, 1970). (FIGURE 1). The average area defoliated during the past 16 years has been 325,219 acres.

Forest tent caterpillar infestations in southern Louisiana have primarily occurred near Lakes Maurepas and Pontchartrain, and along the Atchafalaya and Mississippi River Basins. (FIGURE II). Principal tree species defoliated are sweetgum, tupelo gum, swamp blackgum, black willow, water oak, willow oak, cherrybark oak, swamp chestnut oak, and pecan (Oliver, 1964).

Occurrence of the forest tent caterpillar is not restricted to southern Louisiana. A native insect of North America, infestations have been recorded in nearly every American state and Canada. Bottomlands of the Mobile-Tensas River Basin in southwest Alabama have been partially to completely defoliated for many years (Morris and Orr, 1975). In some parts of North America, defoliation has been recorded since, at least, 1797 (Hodson, 1971).

In Canada, the forest tent caterpillar is one of the major defoliators of decidious trees and periodically infests aspen, sugar maple, birch, ash, and oak (Brown, 1966). In Minnesota, infestations in quaking aspen stands have occurred at about 10-year intervals since the 1870's (Duncan and Hodson, 1958). In the northeast, extensive areas of oak, hickory, cherry, and black-gum have been periodically defoliated (Hodson, 1941).

The increment growth loss and occasional tree mortality resulting from tent caterpillar outbreaks have not been sufficiently important to justify control of infestations. In Alabama, during 1961, DDT was demonstrated as effective in controlling tent caterpillars, but due to the chemicals harmful effects upon fish and wildlife it was not used to any great extent (Morris, 1976). Because tent caterpillars in the South occur in bottomlands with abundant wildlife and which drain into shrimp and oyster beds, chemical control must be undertaken with utmost care. The persistence in the environment of DDT ruled out this chemical as a control agent.

In 1970, a less persistent and target-specific trichlorfon (Dylox^{R}) was developed and tested for use by the Southern Forest Experiment Station (Abrahamson and Morris, 1973). In 1972, this compound was registered for aerial use in southwest Alabama and Louisiana (Morris, 1975).

Trichlorophon and Bacsillus thuringiensis (Bit.), a bacterial agent, were operationally tested in southwest Alabama by the U. S. Forest Service in 1976. Both materials were found to control forest tent caterpillars without any detrimental effect on the environment (Abrahamson, et. al., 1976). To date, however, no large scale aerial control projects have been undertaken in the Southern United States.

In Canada, release of parasites and predators has been made on a small scale, and without much success (Prebble, 1975). Stairs (1964) isolated a nuclear polyhedrosis virus from infestations in Alberta. Experimental applications of the virus have produced encouraging results (Prebble, 1975).

BIOLOGY OF THE FOREST TENT CATERPILLAR

The forest tent caterpillar overwinters in the egg stage. In the spring (April or May in Louisiana) the larvae hatch and feed on expanding buds or young leaves. During the first three instars, the larvae often feed together sometimes clustering on one group of expanding leaves.

Although referred to as a tent caterpillar, this species does not construct tents. The larvae do deposit silk strands as they move about, however. As the larvae mature they reach a size of about 2 inches. Older larvae are often seen wandering individually over the tree branches in search of food or places to pupate. In Louisiana, tent caterpillar feeding is usually complete the first of May.

In the south, pupation occurs in bark crevices or folded leaves of understory species such as maple. Cocoons are spun of white or pale yellow silk. The adult stage, an inconspicuous tan moth, emerges from the cocoons in about 10-14 days. Eggs are laid in masses of 150-300 which encircle twigs. The masses are cemented together with a frothy glue-like substance, which later turns brown. The eggs remain on the twigs until the following spring when a new generation emerges.

Populations of the forest tent caterpillar are affected by a number of natural agents. Freezing weather shortly after eggs hatch may kill large numbers of larvae. High temperatures later in the spring may kill adults or affect viability of newly-laid eggs. In heavily defoliated areas, mortality of late larval stages due to starvation has occurred (Baker, 1972).

A number of species of wasps and flies parasitize tent caterpillar larvae and pupae. In addition, a nuclear polyhedrosis virus disease infects the larvae (Stelzer, 1967). During 1970, a high proportion of the tent caterpillar larvae in water tupelo stands in Alabama were killed by this virus disease. However, in the tupelo forests of southern United States, parasites and predators are not very effective in curbing tent caterpillar outbreaks. Many of the parasites and predators overwinter on or near the ground and spring floods prevent their populations from building up (Morris, 1975). In other regions, such as the Lake States, natural enemies reduce epidemic tent caterpillar populations usually in a few years (Morris, 1965).

CURRENT OUTBREAK IN LOUISIANA

Aerial detection and evaluation of forest tent caterpillar in Louisiana took place May 15, 16 and 17 of 1978. Personnel from the Office of Forestry, Department of Natural Resources, and the U. S. Forest Service, State & Private, made a reconnaissance flight to determine acreage and extent of defoliation. Results of the flight are illustrated in Fig. II.

As noted in Fig. II the general areas of defoliation were observed to be: 1) the area west of Lake Pontchartrain and SE of Baton Rouge, occupying the Tickfaw River Basin, Amite River Basin, Blind River Basin; 2) the portion of the Atchafalaya River Basin floodway north of Morgan City, northwest of Thibodaux, and extending to Plaquemine; and 3) the area between the Mississippi River and Bayou LaFourche, known as Lac de Allemends. This area is SE of Napleonville, north of Thibodaux and west of des Allemands.

The 3 areas are characterized by nearly pure tupelo gum stands. In most cases, the tupelo was completely defoliated by the caterpillars. Some areas of mixed cypress - tupelo stands were observed. In these areas, the tupelo was defoliated, while the cypress and understory maple was not. Intensive logging of cypress during the early part of the century left most of these areas with pure tupelo stands. This abundance of susceptible host may account, in part, for the repeated and severe defoliation which occurs.

The approximate total size of the area defoliated during the spring of 1978 is 696,000 acres. As illustrated in Fig. I, this is a considerable increase in defoliation over the past 3 years.

The general defoliated area is basically the same as in previous years with the exception that this year little to no defoliation occurred in the Mermentau, Sabine, or Calcasieu River Basins located in Southwestern Louisiana.

During the ground phase of the evaluation (May 17) it was noted that caterpillar feeding was complete, and in most cases pupation in folded maple leaves had already occurred. Defoliation was noted to occur about 2-3 weeks later than in previous years (Dr. Richard Goyer, Louisiana State University, personal communication).

Tupelo gum (or water tupelo (Nyssa aquatic) is the primary host species of the forest tent caterpillar in Louisiana. It is found on low wet sites often in combination with cypress. Water stands around the trees many months if not most of the year. The lower trunk is nearly always swollen. The tree may reach 110 feet in height and 3-4 feet in diameter on best sites but more commonly in Louisiana averages 1 foot in diameter and 70 feet in height. Tupelo is found in low areas of all the major floodplains in Louisiana as well as in stream bottoms in the uplands areas.

Tupelo is cut principally for lumber, veneer, pulpwood and some railroad ties and slack cooperage. Lumber goes into boxes, pallets, crates, baskets and furniture. The wood of tupelo is white and can be stained easily. The greatest demand is for furniture veneer which is also the highest use value.

Presently in Louisiana, the supply of tupelo gum is greater than the demand. There are few mills in Louisiana utilizing tupelo gum for furniture veneer. Average stumpage prices have been about $25-$30 per MBF. Flooded tupelo stands, in combination with a general lack of mills in tupelo areas, has made intensive utilization of tupelo uneconomical.

Most tupelo stands contain only a small percentage of veneer quality logs. To make logging economical, tupelo stands would have to be clearcut. A lack of paper mills in tupelo hauling vicinities to utilize the pulp-size material makes such a operation unpractical. In the future, possible development of fuelwood and pulpwood market, in SE Louisiana might make more intensive management of these stands practical.

Effect of the forest tent caterpillar on tupelo growth was measured recently in Alabama. Morris (1976) found that growth losses due to defoliation averaged 48% per year. He added, however, that effort and expense of spraying trees increased their growth by only .15 inch per year. While this 52% increase in growth per year appears important, it is of little ecomomic value and cannot justify control in the stagnated tupelo forests (Morris, 1976).

One important effect of tent caterpillar defoliation however, is the apparent destruction of the seed crop from the tent caterpillars eating tree flowers (Morris, 1976). An advantage, therefore of controlling caterpillar populations would be to assure seed crops. This control spraying should be done 1 and/or 2 years prior to harvest (Morris, 1976). In addition Morris recommends that yearly growth of regenerated stands be maintained by caterpillar control spraying. According to the Alabama Forestry Commission (James Hyland, AFC personal communication) some companies in Southeastern Alabama are spaying tupelo stands prior to harvest to insure adequate seed crops.

RECOMMENDATIONS

1. The effects of forest tent caterpillar defoliation in the tupelo forests of southern Louisiana have not been assessed. Before a wide spread insect control is pursued, the impact of defoliation should be measured. This should include measurements of stand data such as composition, growth, and quality.

2. For protection of seed crops or to prevent defoliation of shade trees, currently recommended insecticides are:

   Dylox - ULV^{R} (EPA Reg. # 3125-210) and 2 bacterial sprays,

   Thuricide - HP^{R} (# 11273-3), and Dipel (275-18-Ab-50546).

   Application of insecticides should follow safety precautions listed on the labels.

FIGURE I

Defoliation by the forest tent caterpillar in Southern Louisiana

YEAR	ACRES
1962	431,000
1963	1,556,600
1964	----------
1965	----------
1966	----------
1967	174,000
1968	----------
1969	90,000
1970	477,000
1971	520,000
1972	415,000
1973	260,000
1974	500,000
1975	104,000
1976	300,000
1977	495,000
1978	696,000

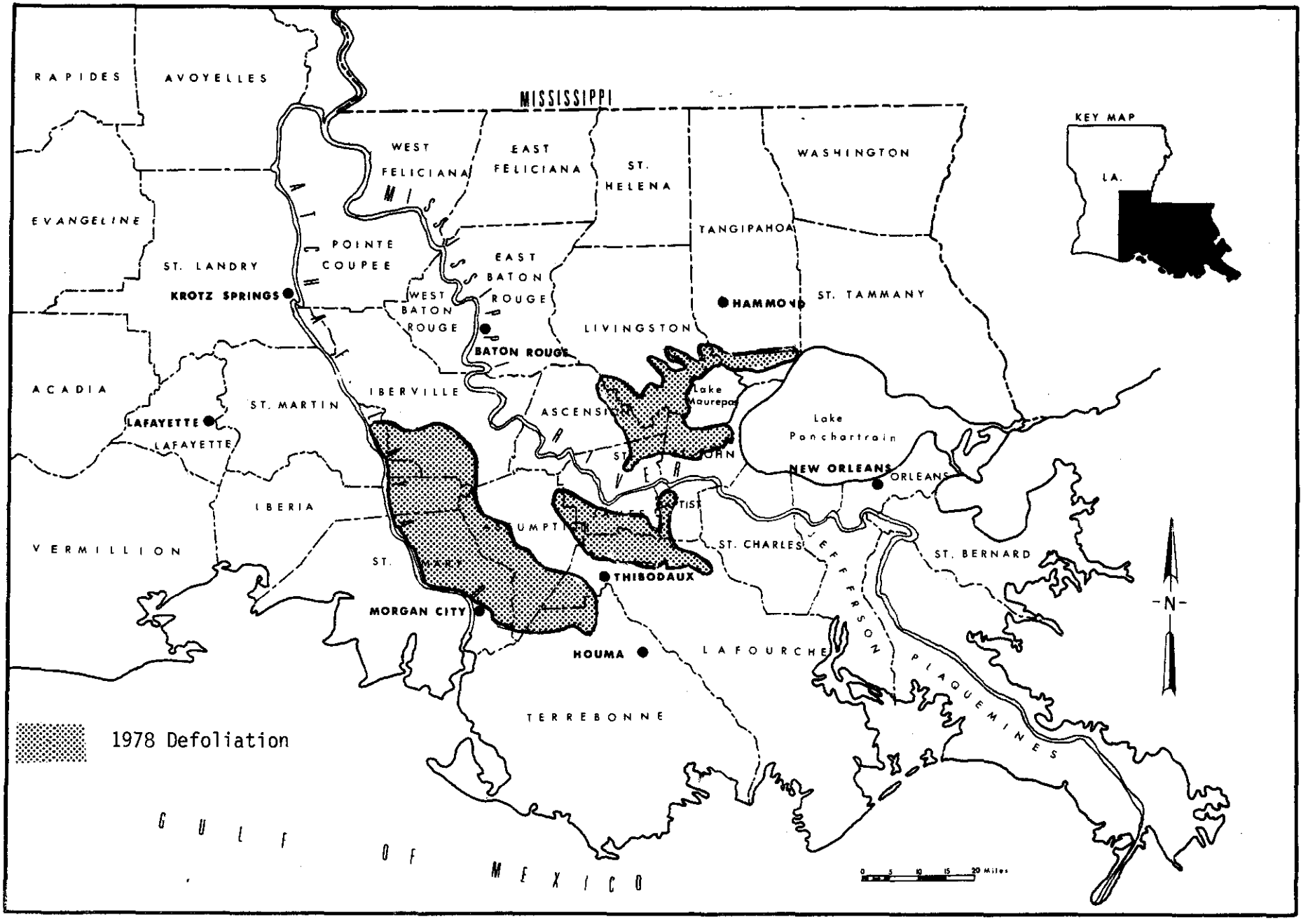


Fig. 2 Forest tent caterpillar defoliation in Louisiana in 1978

REFERENCES

Hodson, A. C. 1941. An ecological study of the forest tent caterpillar, Malacosoma disstria Hbn., in northern Minnesota. Univ. of Minn. Agri. Exp. Sta. Tech. Bul. 148. pp. 55

Nachod, L. H. 1977. 1977 Spring defoliation by forest insects in Louisiana. Louisiana Forestry Comm. Insect and Disease Report. May 1977.

Nachod, L. H. and D. R. Kucera. 1970. 1970 Forest tent caterpillar defoliation in south Louisiana. La. Forestry Comm. Insect and Disease Report. May 1970.

Morris, R. C. and L. W. Orr. 1962. Caterpillars-Fish-Trees. Proc., Soc. American Foresters. Atlanta, Ga. 1962.

Brown, C. E. 1966. Habits and control of the forest tent caterpillar. Dept. of Forestry of Canada, Ottawa. pp. 5.

Duncan, D. P. and A. C. Hodson. 1958. Influence of the forest tent caterpillar upon the aspen forests of Minnesota. For. Sci. 4(1): 71-93.

Morris, R. C. 1976. Impact of the forest tent caterpillar, Malacosoma disstria Hbn. (Lepidoptera:Lasiocampidae), on bottomland hardwood forests. Final report. Southern Forest Exp. Stn. pp. 21.

Abrahamson, L. P. and R. C. Morris. 1973. Forest tent caterpillar control with ULV Trichlorfon in water tupelo ponds. J. Econ. Ent. 66(2): pp. 574.

Morris, R. C. 1975. Tree-eaters in the tupelo swamps. Forests and People. 1st Quarter 1975. pp. 22-24.

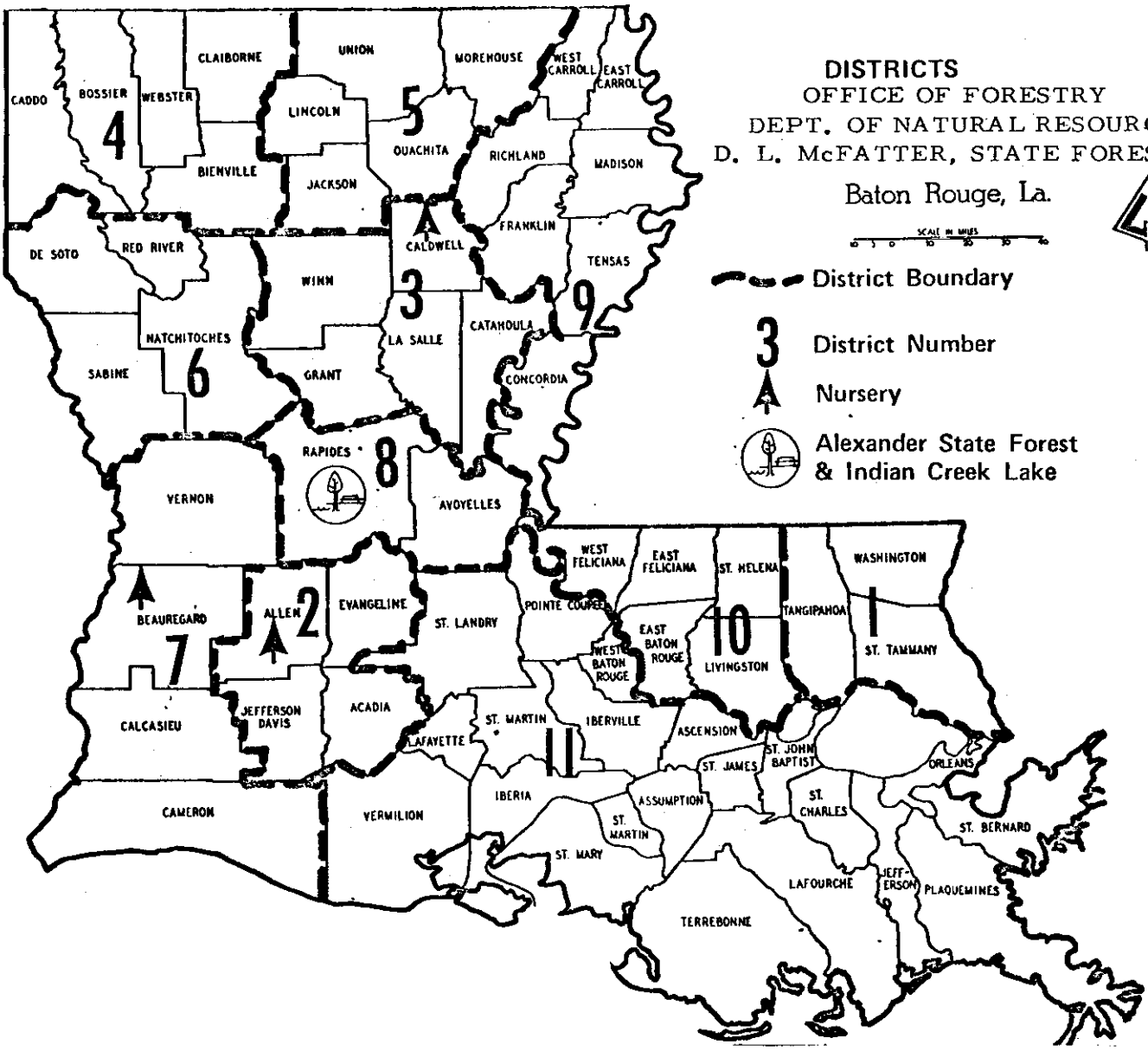
Abramson, L. P., J. D. Harper, and I. R. Ragenovich. 1976. Pilot control project using Trichlorfon and Bacillus thuringiensis against forest tent caterpillar in southwest Alabama. Final report. USDA Forest Serv. SE S&PF, FI&DM. Report No. 77-1-6.

Prebble, M. L. 1975. Forest tent caterpillar in aerial control of forest insects in Canada. pp. 200-203 M. L. Prebble (ed.). Howarth and Smith, L.T.D., Ottawa. pp. 329.

Stelzer, M. J. 1967. Control of a tent caterpillar, Malacosoma fragile incurva, with an aerial application of a nuclear-polyhedrosis virus and Bacillus thuringiensis. J. Econ. Ent. 60(1):38-41.

Oliver, A. D. 1964. Control studies of the forest tent caterpillar, Malacosoma disstria, in Louisiana. J. Econ. Ent. (57(1):157-160.

Morris, R. C. 1965. Controlling insect damage to southern hardwood forests. Insects in Southern Forests. Proc. Fourteenth Annual Forestry Sym., L.S.U. pp. 114-124.



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